

WHAT IS CLAIMED IS:

1. A method of manufacturing a semiconductor device in which a semiconductor element is formed in a semiconductor substrate, including a step of  
5 selectively grinding or polishing the peripheral portion and the beveled portion on the side of the main surface of a target substrate including a semiconductor substrate.

2. The method of manufacturing a semiconductor device according to claim 1, wherein the step of  
10 selectively grinding or polishing the peripheral portion and the beveled portion on the side of the main surface of the target substrate is carried out after a step of forming an uneven portion in the target  
15 substrate.

3. The method of manufacturing a semiconductor device according to claim 1, wherein the step of selectively grinding or polishing the peripheral portion and the beveled portion on the side of the main  
20 surface of the target substrate is carried out after at least one additional step following a step of forming an uneven portion in the target substrate.

4. The method of manufacturing a semiconductor device according to claim 1, wherein the step of  
25 selectively grinding or polishing the peripheral portion and the beveled portion on the side of the main surface of the target substrate is carried out after

a step of covering the main surface of the target substrate with a resist film, said step being carried out after the step of forming an uneven portion in the target substrate.

5           5. The method of manufacturing a semiconductor device according to claim 1, wherein the step of selectively grinding or polishing the peripheral portion and the beveled portion on the side of the main surface of the target substrate is carried out after a  
10       step of forming a film of a material providing a source of contamination of the processing machine for applying a predetermined processing to the target substrate including the semiconductor substrate or providing a source of contamination of the semiconductor substrate.

15           6. A method of manufacturing a semiconductor device comprising:  
          applying an anisotropic dry etching treatment to form an uneven portion in a target substrate including a semiconductor substrate; and  
20       selectively grinding or polishing the peripheral portion and the beveled portion on the side of the main surface of the target substrate including the semiconductor substrate.

          7. A method of manufacturing a semiconductor  
25       device comprising:

          a first step of forming an insulating film on a semiconductor substrate;

a second step of applying an anisotropic etching to the insulating film and the semiconductor substrate so as to form a trench in the semiconductor substrate;

5 a third step of depositing a polysilicon film in a manner to cover the main surface of the semiconductor substrate including the inner surface of the trench;

10 a fourth step of grinding or polishing the peripheral portion and the beveled portion on the side of the main surface of the semiconductor substrate covered with the polysilicon film; and

a fifth step of polishing the polysilicon film with the insulating film used as a stopper.

15 8. The method of manufacturing a semiconductor device according to claim 7, wherein said trench is used for forming a trench capacitor formed on said semiconductor substrate.

9. The method of manufacturing a semiconductor device according to claim 7, wherein the second step is a dry etching step.

20 10. The method of manufacturing a semiconductor device according to claim 7, wherein the fifth step is a chemical and mechanical polishing step.

25 11. The method of manufacturing a semiconductor device according to claim 7, wherein said insulating film comprises a first insulating film formed on said semiconductor substrate and a second insulating film formed on said first insulating film, and said second

insulating film is used as a stopper in the step of polishing said polysilicon film.

12. The method of manufacturing a semiconductor device according to claim 11, wherein said first  
5 insulating film is a silicon oxide film, and said second insulating film is a silicon nitride film.

13. A method of manufacturing a semiconductor device, comprising:

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10 a first step of forming a first insulating film on a semiconductor substrate;

a second step of etching the first insulating film to form a trench in the first insulating film;

a third step of forming a barrier metal layer on the upper surface of the first insulating film and on  
15 the inner surface of the trench;

a fourth step of depositing a metal layer in a manner to cover the main surface side of the semiconductor substrate with the barrier metal layer interposed therebetween;

20 a fifth step of grinding or polishing the peripheral portion and the beveled portion on the side of the main surface of the semiconductor substrate covered with the metal layer;

a sixth step of polishing the first insulating  
25 film with the metal layer used as a stopper so as to remove the metal layer and the barrier metal layer on the upper surface of the first insulating film so as to

planarize the surface; and

a seventh step of forming a second insulating film in a manner to cover the upper surface of the first insulating film and the upper surface of the metal layer.

14. The method of manufacturing a semiconductor device according to claim 13, wherein said trench is used as a wiring trench for forming a damascene wiring of said semiconductor device.

15. The method of manufacturing a semiconductor device according to claim 13, wherein the second step is an anisotropic dry etching step.

16. The method of manufacturing a semiconductor device according to claim 13, wherein the sixth step is a chemical and mechanical polishing step.

17. The method of manufacturing a semiconductor device according to claim 13, wherein said first insulating film is a silicon oxide film.

18. The method of manufacturing a semiconductor device according to claim 13, wherein said second insulating film is a laminate film consisting of a silicon oxide film and a silicon nitride film.

19. The method of manufacturing a semiconductor device according to claim 13, wherein said barrier metal includes a TaN film formed by a sputtering method.

20. The method of manufacturing a semiconductor

device according to claim 13, wherein said metal layer is a copper layer deposited by a plating method.

21. A method of manufacturing a semiconductor device, comprising:

5           forming an insulating film on a semiconductor substrate;

          selectively etching the insulating film to form a trench in the insulating film;

          forming a film containing a contaminant material  
10       formed in the manufacturing step of the semiconductor device; and

          grinding or polishing the peripheral portion and the beveled portion on the side of the main surface of the semiconductor substrate covered with the film  
15       containing the contaminant material.

22. The method of manufacturing a semiconductor device according to claim 21, wherein the film containing a contaminant material formed in the manufacturing process of said semiconductor device is  
20       a film containing a metal element selected from the group consisting of Cu, Ag, Ni, Co, Ru, Pb, and Fe.